



# CENTRAL LIGHT RAIL LINE

# HOWARD STREET TRACK RECONSTRUCTION - PHASE II

CONTRACT NO. T-0857-0140

**JULY 27, 2001**

PROJECT	LOCATION
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DMJM ET

**DANIEL, MANN, JOHNSON, & MENDENHALL** **EARTH TECH**  
A JOINT VENTURE

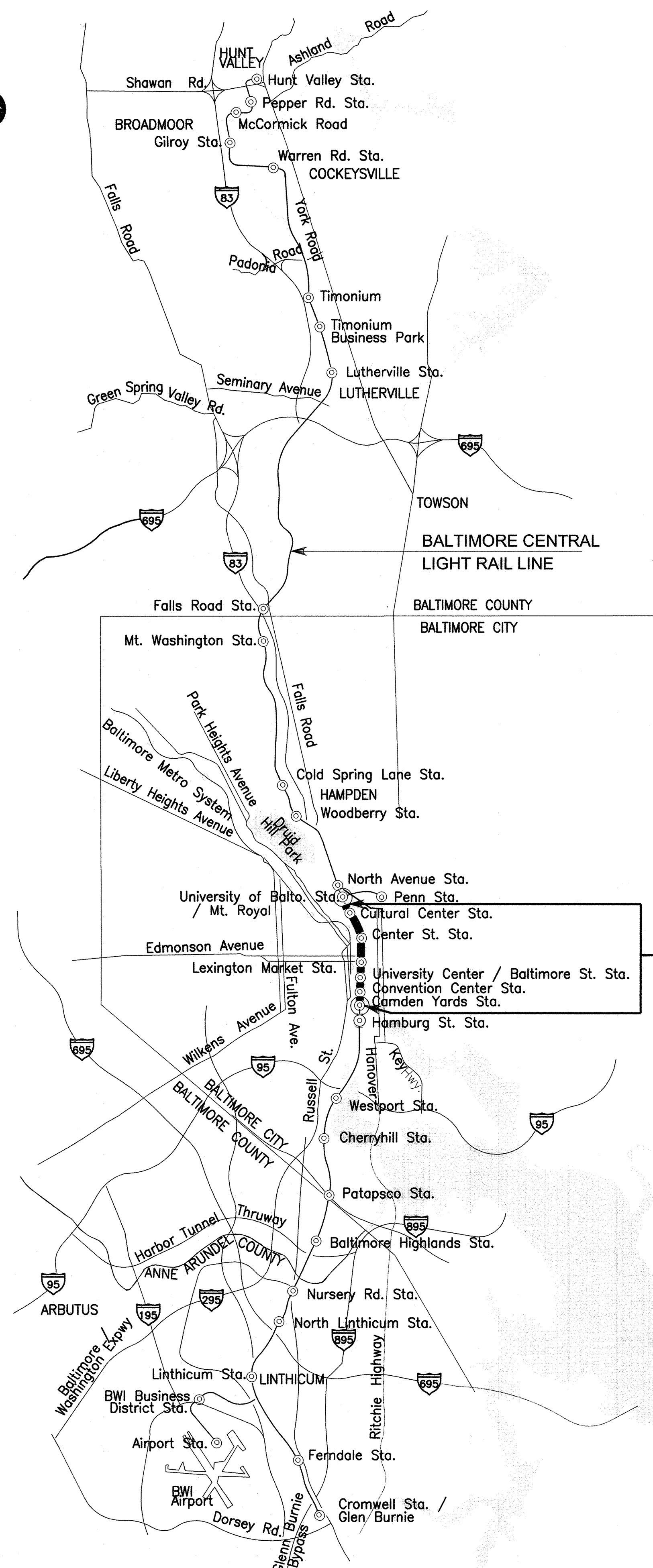
7/27/01  
PROJECT MANAGER (T. THOMAS M. KIRBY, P.E.)



MASS TRANSIT ADMINISTRATION

M. J. Sharma  
MANAGER OF FACILITIES ENGINEERING

7-27-01  
DATE



SHEET DRAWING  
NO. NO. TITLE

CONTRACT DRAWINGS

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2	G-1	INDEX OF DRAWINGS
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4	G-3	ABBREVIATIONS, SYMBOLS & GENERAL NOTES
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9	T-20	DETAILS - RESTRAINING RAIL AND RAIL BOOT
10	T-21	RESTRAINING RAIL LAYOUT AND DETAIL
11	T-25	DETAILS - TRACK DRAINS
12	T-26	REPLACEMENT OF CROSS-BONDING & NEG RET CAB

MARYLAND DEPARTMENT OF TRANSPORTATION



MASS TRANSIT  
ADMINISTRATION



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DANIEL, MANN, JOHNSON, & MENDENHALL EARTH TECH  
A JOINT VENTURE



NO.	DESCRIPTION	BY	DATE
REVISIONS			

SDJ  
TRS  
DAS  
TMK

CENTRAL LIGHT RAIL LINE  
HOWARD STREET TRACK RECONSTRUCTION  
PHASE II

INDEX OF DRAWINGS

DATE: 7/27/01

SCALE: NONE

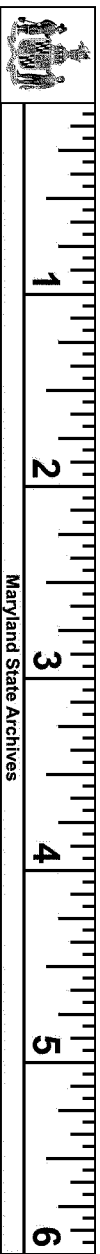
CONTRACT NO.  
T-0857-0140

DRAWING NO.

G-1

SHEET NO.

2 OF



SHEET NO.	DRAWING NO.	TITLE
REFERENCE DRAWINGS (FROM ORIGINAL CONSTRUCTION CONTRACT NO. CL03)		
13	CG-016-01	TRACK ALIGNMENT DATA
14	CG-017-01	TRACK ALIGNMENT DATA
15	CG-018-00	TRACK ALIGNMENT DATA
16	CG-019-00	TRACK ALIGNMENT DATA
17	RC-016-00	VERTICAL CONTROL DIAGRAM AND DESCRIPTIONS
18	RC-017-00	HORIZONTAL CONTROL DIAGRAM & DATA
19	RC-018-00	HORIZONTAL CONTROL REFERENCE DIAGRAMS
20	CG-001-01	GENERAL ALIGNMENT PLAN STA. S/W 15+50 TO STA. S/W 15+00
21	CG-002-02	GENERAL ALIGNMENT PLAN STA. S/W 15+00 TO STA. S/W 8+80
22	CG-003-01	GENERAL ALIGNMENT PLAN STA. S/W 8+80 TO STA. S/W 2+70
23	CG-004-02	GENERAL ALIGNMENT PLAN STA. S/W 2+70 TO STA. N/E 3+40
24	CG-005-00	GENERAL ALIGNMENT PLAN STA. N/E 3+40 TO STA. N/E 9+50
25	CG-006-01	GENERAL ALIGNMENT PLAN STA. N/E 9+50 TO STA. N/E 15+60
26	CG-007-01	GENERAL ALIGNMENT PLAN STA. N/E 15+60 TO STA. N/E 21+65
27	CG-008-00	GENERAL ALIGNMENT PLAN STA. N/E 21+65 TO STA. N/E 27+75
28	CG-009-01	GENERAL ALIGNMENT PLAN STA. N/E 27+75 TO STA. N/E 33+80
29	CG-010-00	GENERAL ALIGNMENT PLAN STA. N/E 33+80 TO STA. N/E 39+90
30	CG-011-00	GENERAL ALIGNMENT PLAN STA. N/E 39+90 TO STA. N/E 45+80
31	CG-012-01	GENERAL ALIGNMENT PLAN STA. N/E 45+80 TO STA. N/E 52+00
32	CG-013-00	GENERAL ALIGNMENT PLAN STA. N/E 52+00 TO STA. N/E 58+00
33	CG-014-00	GENERAL ALIGNMENT PLAN STA. N/E 58+00 TO STA. N/E 63+00
34	CG-015-03	GENERAL ALIGNMENT PLAN STA. N/E 63+00 TO STA. N/E 68+50
35	CC-001-02	CROSS SECTIONS STA. S/W 14+00 AND STA. S/W 12+00 OPTION A
36	CC-002-02	CROSS SECTIONS STA. S/W 10+00 AND STA. S/W 9+15 OPTION A
37	CC-003-01	CROSS SECTIONS STA. S/W 8+00 AND STA. S/W 5+00 OPTION A
38	CC-004-00	CROSS SECTIONS STA. S/W 1+00 AND STA. S/W 3+00 OPTION A
39	CC-005-02	CROSS SECTIONS STA. N/E 3+00 AND STA. N/E 5+00 OPTION A

SHEET NO.	DRAWING NO.	TITLE
40	CC-009-01	CROSS SECTIONS STA. N/E 36+00 AND STA. N/E 41+00 OPTION A
41	CC-013-03	CROSS SECTIONS STA. N/E 63+00 AND STA. N/E 65+50 OPTION A
42	CD-001-02	SITE DEVELOPMENT PLAN STA. S/W 15+50 TO STA. S/W 15+00
43	CD-002-06	SITE DEVELOPMENT PLAN STA. S/W 15+00 TO STA. S/W 8+80
44	CD-003-06	SITE DEVELOPMENT PLAN STA. S/W 8+80 TO STA. S/W 2+70
45	CD-004-02	SITE DEVELOPMENT PLAN STA. S/W 2+70 TO STA. N/E 3+40
46	CD-005-04	SITE DEVELOPMENT PLAN STA. N/E 3+40 TO STA. N/E 9+50
47	CD-006-03	SITE DEVELOPMENT PLAN STA. N/E 9+50 TO STA. N/E 15+60
48	CD-007-02	SITE DEVELOPMENT PLAN STA. N/E 15+60 TO STA. N/E 21+65
49	CD-008-04	SITE DEVELOPMENT PLAN STA. N/E 21+65 TO STA. N/E 27+75
50	CD-009-02	SITE DEVELOPMENT PLAN STA. N/E 27+75 TO STA. N/E 33+80
51	CD-010-03	SITE DEVELOPMENT PLAN STA. N/E 33+80 TO STA. N/E 39+90
52	CD-011-03	SITE DEVELOPMENT PLAN STA. N/E 39+90 TO STA. N/E 45+80
53	CD-012-04	SITE DEVELOPMENT PLAN STA. N/E 45+80 TO STA. N/E 52+00
54	CD-013-05	SITE DEVELOPMENT PLAN STA. N/E 52+00 TO STA. N/E 58+00
55	CD-014-06	SITE DEVELOPMENT PLAN STA. N/E 58+00 TO STA. N/E 63+00
56	TS-352-01	TYPICAL EMBEDDED TRACK ARRANGEMENTS OPTION A
57	TS-353-02	TYPICAL EMBEDDED TRACK ARRANGEMENTS OPTION A
58	TS-354-03	EMBEDDED TRACK DETAILS RAIL/RAIL WITH STRAP GUARD OPTION A
59	TS-355-00	TRANSITION SECTION EMBEDDED TRACK TO BALLASTED TRACK OPTION A AND B
60	TS-501-00	115 RE STRAP GUARD FOR SPECIAL TRACKWORK INSTALLATION
61	TS-502-00	115 RE RAIL STRAP GUARD ENDS, JOINTS AND HOLES
62	TS-503-00	STRAP GUARDED CURVES PRIMARY TRACK TABLES AND NOTES
63	TS-537-00	EMBEDDED TRACK TRACK DRAINAGE TROUGH LAYOUT
64	TS-539-00	EMBEDDED TRACK TRACK DRAINAGE TROUGH DETAILS

StdBorder.DWG  
1-22-99 SAC

MARYLAND DEPARTMENT OF TRANSPORTATION



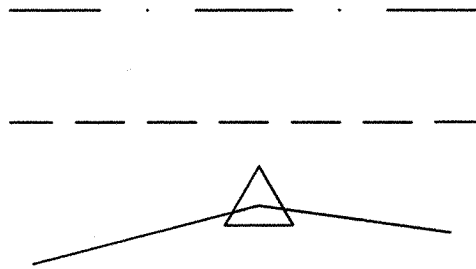




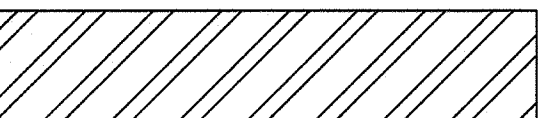
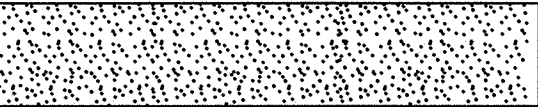
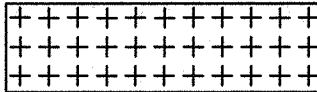

DANIEL, MANN, JOHNSON, & MENDENHALL EARTH TECH  
A JOINT VENTURE



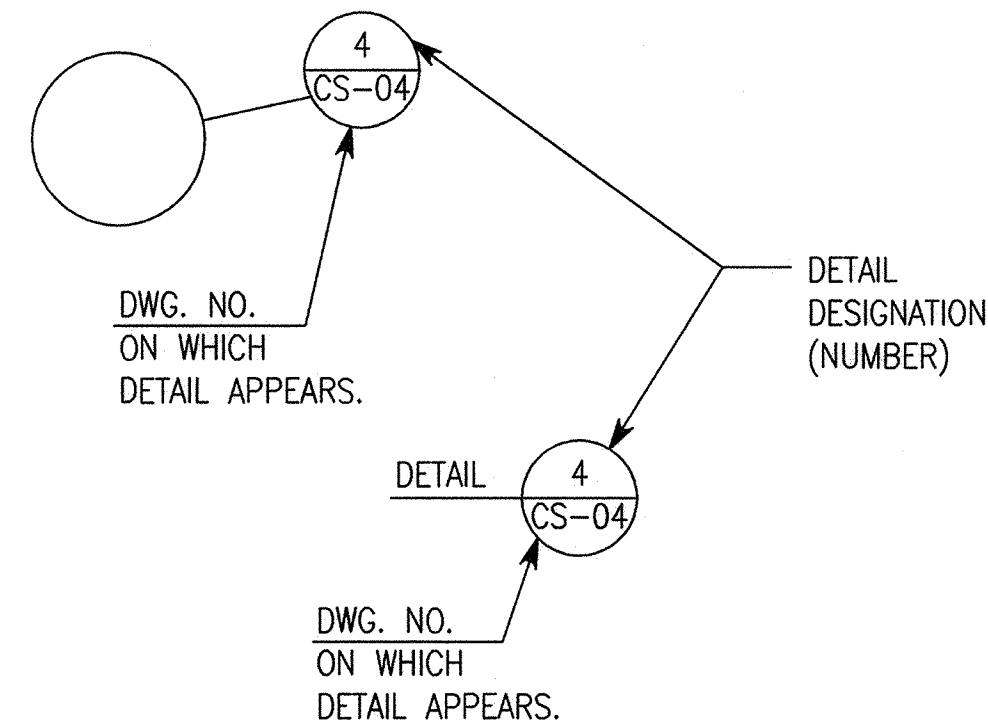
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				DRAWN	TRS		DRAWING NO.
				CHECK	DAS	INDEX OF REFERENCE DRAWINGS	G-2
NO.	DESCRIPTION	BY	DATE	APPR	TMK		SHEET NO.
REVISIONS						DATE: 7/27/01	SCALE: NONE
							3 OF



## SYMBOLS

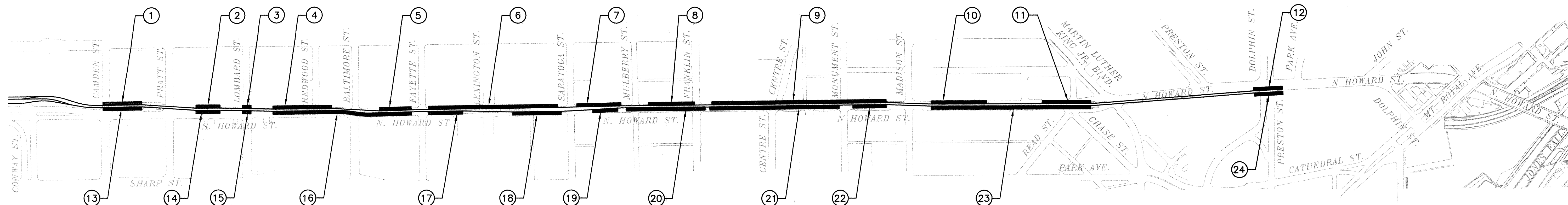
	CENTERLINE
	EXISTING MATERIALS, FACILITIES, OR GRADE
	POINT OF INTERSECTION, VERTICAL POINT OF INTERSECTION
	EQUATION IN STATIONING
	CONCRETE
	STEEL
	GROUT
	ELASTOMERIC GROUT
	SUBGRADE

1. ALL COORDINATES ARE BASED ON THE MARYLAND STATE COORDINATE SYSTEM, AS ADJUSTED FOR THE CLRL PROJECT.
2. ALL ELEVATIONS AND BENCHMARKS ARE BASED ON USC&GS MEAN SEA LEVEL DATUM, 1929 ADJUSTMENT.
3. HORIZONTAL AND VERTICAL DISTANCES ARE IN FEET, EXCEPT AS NOTED OTHERWISE.
4. RECONSTRUCT TRACKS TO THE HORIZONTAL TRACK ALIGNMENT OF THE ORIGINAL MTA CLRL TRACK CONSTRUCTION CONTRACT NO. CLO3, AS BUILT. FOR HORIZONTAL TRACK DATA, REFER TO INCLUDED CONTRACT NO. CLO3 REFERENCE DWG. NOS. CG-016-01 THROUGH CG-019-00
5. THE ADMINISTRATION WILL PROVIDE THE CONTRACTOR A SURVEY OF THE EXISTING VERTICAL TRACK ALIGNMENT. THE CONTRACTOR SHALL REINSTALL RAILS TO THE EXISTING TOP OF RAIL PROFILE. THE ENGINEER MAY DIRECT THE CONTRACTOR TO RAISE THE TOP OF RAIL PROFILE AS MUCH AS 1/4" AT CERTAIN LOCATIONS, AT NO COST TO THE ADMINISTRATION. FOR THOSE LOCATIONS, THE ENGINEER WILL PROVIDE VERTICAL ALIGNMENT INFORMATION.



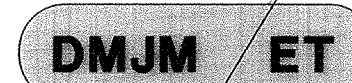
The diagram illustrates the relationship between two sections, A and CS-04, and their respective drawing numbers. Section A is at the top, and Section CS-04 is at the bottom. A line connects them, with labels "DWG. NO. ON WHICH SECTION APPEARS." and "SECTION DESIGNATION (LETTER)".

## SECTIONS

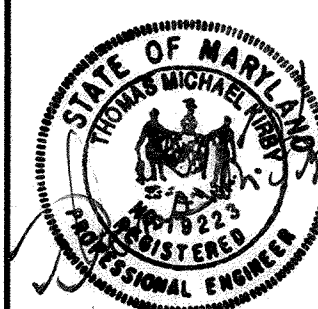


SUMMARY OF WORK												
SITE			LIMITS OF WORK		APPROXIMATE LENGTH OF TRACK (TRACK FEET)	REQUIRED WORK (SEE NOTE 1)						
NO	TRACK	DESCRIPTION	FROM	TO		REMOVE EMBEDMENT CONCRETE AROUND RAILS AND PLACE RAIL BOOT (RAIL FEET)	REMOVE STRAP GUARD & EXISTING RUNNING RAILS	REPLACE RUNNING RAILS (RAIL FEET)	PLACE RESTRAINING RAIL (RAIL FEET)	RECONSTRUCT EXISTING TRACK DRAINS (QUANTITY)	LOCATIONS OF CROSS BONDS TO REPLACE (QTY)	LOCATIONS OF NEGATIVE RETURN CABLES TO REPLACE (QTY)
1	SB	CAMDEN ST. TO PRATT ST.	S/W 15+10	S/W 12+45	265	530				2		
2	SB	PRATT ST. TO LOMBARD ST.	S/W 9+66	S/W 8+15	151	302				2		
3	SB	LOMBARD STREET	S/W 6+75	S/W 6+25	35	70		75	35			
4	SB	LOMBARD ST. TO BALTIMORE ST.	S/W 5+15	S/W 1+35	380	760				2		
5	SB	BALTIMORE ST. TO FAYETTE ST.	N/W 1+19	N/W 3+37	218	436	101	101				
6	SB	FAYETTE ST. TO SARATOGA ST.	N/W 4+38	N/W 12+18	780	1560				3	1	
7	SB	SARATOGA ST. TO MULBERRY ST.	N/W 13+28	N/W 15+90	262	524	114	114		1		
8	SB	MULBERRY ST. TO FRANKILN ST.	N/W 17+55	N/W 20+30	275	550	19	19		2	1	
9	SB	FRANKLIN ST. TO MADISON ST.	N/W 21+33	N/W 31+75	1042	2084	216	216		4	1	1
10	SB	MADISON ST. TO ARMORY ST.	N/W 34+44	N/W 37+73	329	658						
11	SB	ARMORY ST. TO M.L. KING BLVD.	N/W 41+05	N/W 44+33	328	656						
12	SB	PRESTON ST.	N/W 54+16	N/W 55+01	85	170						
13	NB	CAMDEN ST. TO PRATT ST.	S/E 15+10	S/E 12+45	265	530				2		
14	NB	PRATT ST. TO LOMBARD ST.	S/E 9+66	S/E 8+15	151	302				2		
15	NB	LOMBARD STREET	S/E 6+75	S/E 6+25	35	70		75	35			
16	NB	LOMBARD ST. TO FAYETTE ST.	S/E 5+15	S/W 3+45	860	1720	101	569	294	2	1	
17	NB	FAYETTE ST. TO LEXINGTON ST.	N/E 4+40	N/E 6+48	208	416				1		
18	NB	LEXINGTON ST. TO SARATOGA ST.	N/E 9+42	N/E 12+41	299	598				1	1	
19	NB	SARATOGA ST. TO MULBERRY ST.	N/E 14+21	N/E 15+75	154	308	154	154				
20	NB	MULBERRY ST. TO FRANKLIN ST.	N/E 16+25	N/E 20+95	470	940	19	19		2	1	
21	NB	FRANKLIN ST. TO MONUMENT ST.	N/E 21+20	N/E 28+95	775	1550	215	215		4		
22	NB	MONUMENT ST. TO MADISON ST.	N/E 29+75	N/E 31+75	200	400						
23	NB	MADISON ST. TO M.L. KING BLVD.	N/E 34+44	N/E 44+01	957	1914					1	
24	NB	PRESTON ST.	N/E 54+15	N/E 54+97	82	164						
		TOTALS			8606	17,212	939	1557	364	30	7	1

1. THIS SUMMARY OF WORK LISTS APPROXIMATE QUANTITIES OF SOME BUT NOT ALL OF THE WORK ITEMS. FOR MORE COMPLETE DETAILS, REFER TO THE OTHER CONTRACT DRAWINGS AND SPECIFICATIONS.



**DANIEL, MANN, JOHNSON, & MENDENHALL EARTH TECH**  
A JOINT VENTURE

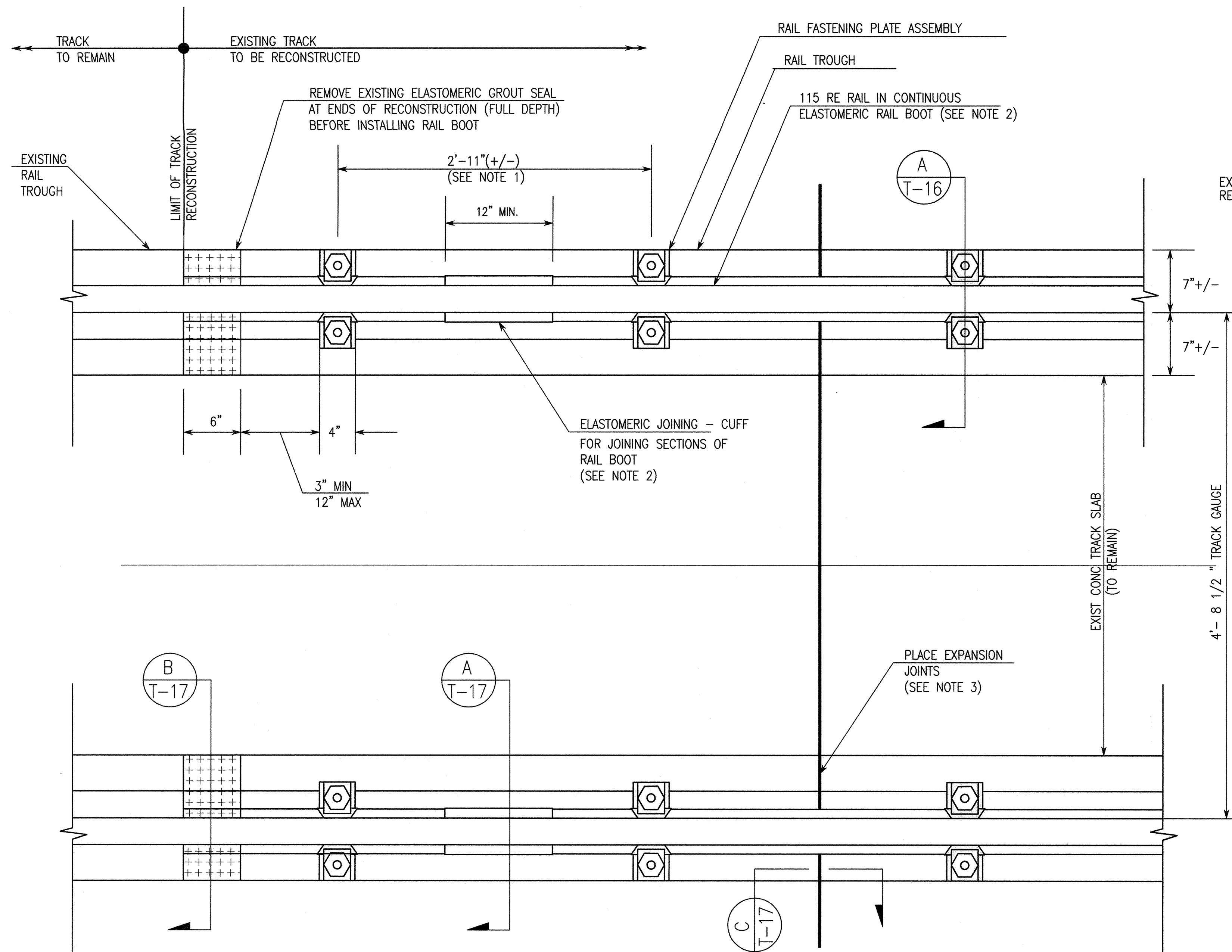


				SDJ	CENTRAL LIGHT RAIL LINE HOWARD STREET TRACK RECONSTRUCTION PHASE II	CONTRACT NO. T-0857-0140
				TRS		DRAWING NO.
				DAS	VICINITY MAP	G-4
NO.	DESCRIPTION	BY	DATE	TMK		DATE: 7/27/01
REVISIONS					SCALE: 1"=300'-0'	

StdBorder.DWG SAC



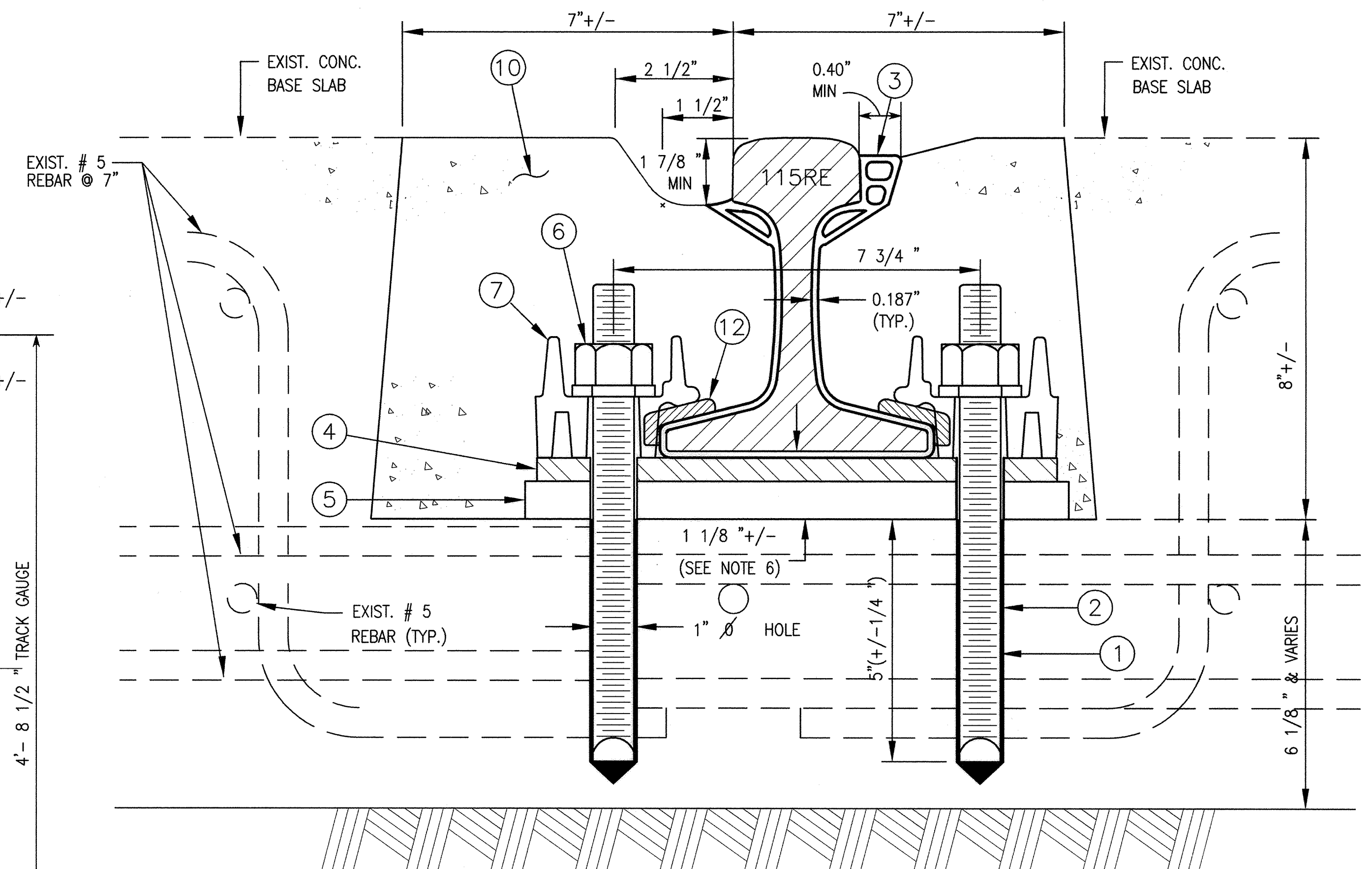




DETAIL: PARTIAL PLAN OF ELASTOMERIC BOOT/PLATE

SCALE: 1 1/2 " = 1'-0"

BILL OF MATERIAL – ELASTOMERIC BOOT/PLATE		
ITEM NO.	QUANTITY PER ASSEMBLY	DESCRIPTION – MATERIAL SUPPLIED BY CONTRACTOR
①	2 EACH	FULLY-THREADED ANCHOR ROD WITH FLATTENED END, 7/8" DIA X 10"
②	AS REQ'D	ANCHOR ADHESIVE (SEE NOTE 5)
③	AS REQ'D	ELASTOMERIC RAIL BOOT – CONTINUOUS
④	1	STEEL PLATE, 1/2"x4"x 11"
⑤	AS REQ'D	HEIGHT ADJUSTMENT SHIM(S) – VARIABLE THICKNESS
⑥	2 EACH	HEAVY-HEX NUT AND LOCK WASHER, 7/8" DIA
⑦	2 EACH	COMPRESSION CLIP
⑧	AS REQ'D	JOINING CUFF FOR ELASTOMERIC RAIL BOOT, 12" LENGTH (SEE DWG T-17, SECTION A)
⑨	AS REQ'D	SEALER/ADHESIVE FOR ADHERING/JOINING CUFF TO ELASTOMERIC RAIL BOOT (SEE DWG T-17, SECTION A)
⑩	AS REQ'D	CONCRETE
⑪	AS REQ'D	ELASTOMERIC GROUT – TO SEAL ENDS OF RECONSTRUCTED TRACK (SEE NOTE DWG T-17, SECTION B)
⑫	2 EACH	RAIL CLIP INSULATOR



SECTION - EMBEDDED RAIL, SHOWN AT RAIL FASTENING PLATE

SCALE: 1/2" = 1" (T-16) T-25

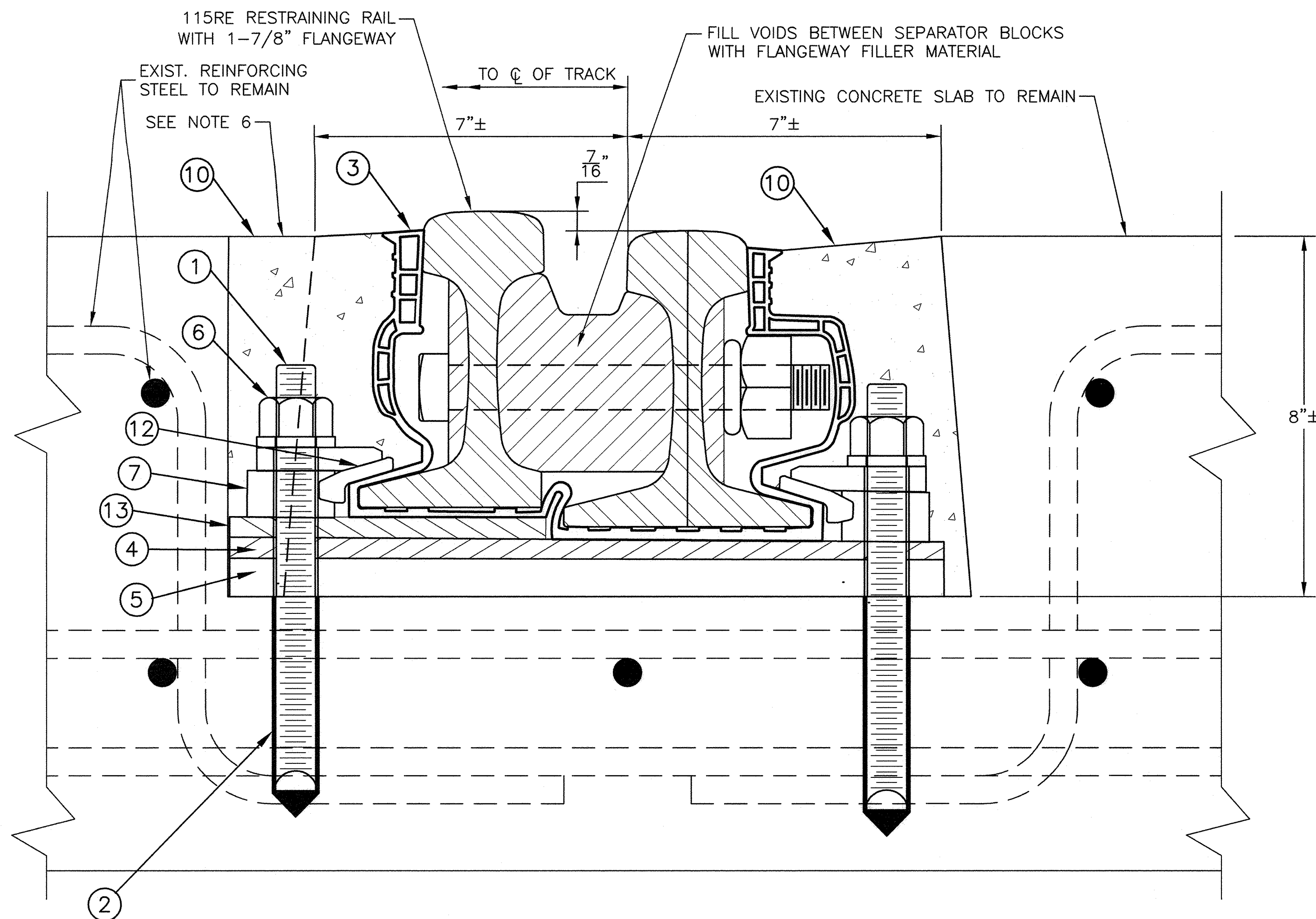
NOTES:

1. AVOID DRILLING INTO EXISTING REBARS IN TRACK SLAB. DETECT AND MARK REBARS BEFORE DRILLING HOLES FOR ANCHOR BOLTS FOR RAIL FASTENING PLATES. SPACING OF PLATES MAY BE ADJUSTED, AS REQUIRED TO AVOID REBARS. MAXIMUM ALLOWABLE SPACING OF PLATES SHALL BE 3'-3"
2. RAIL BOOT SUPPLIED IN APPROXIMATELY 200 FT LENGTHS. DO NOT CUT RAIL BOOT EXCEPT AS REQUIRED AT ENDS OF RECONSTRUCTION, TO MINIMIZE NUMBER OF JOINING CUFFS REQUIRED.
3. PLACE EXPANSION JOINTS IN RAIL TROUGH CONCRETE, TO MATCH EXISTING JOINTS IN EXISTING TRACK SLAB.
4. EMBEDDED TRACK SHALL BE INSTALLED WITH ZERO RAIL CANT AND NO SUPERELEVATION.
5. REFER TO SPECIAL PROVISIONS FOR FURTHER DETAILS OF ANCHOR ROD ASSEMBLY. CONTRACTOR MAY PROPOSE ALTERNATE ANCHORING DESIGN FOR APPROVAL.
6. IF EXISTING RAIL TROUGH IS TOO SHALLOW TO FIT THE RAIL BOOT AND PLATE, GRIND OR CHIP EXISTING CONCRETE, AS REQUIRED.

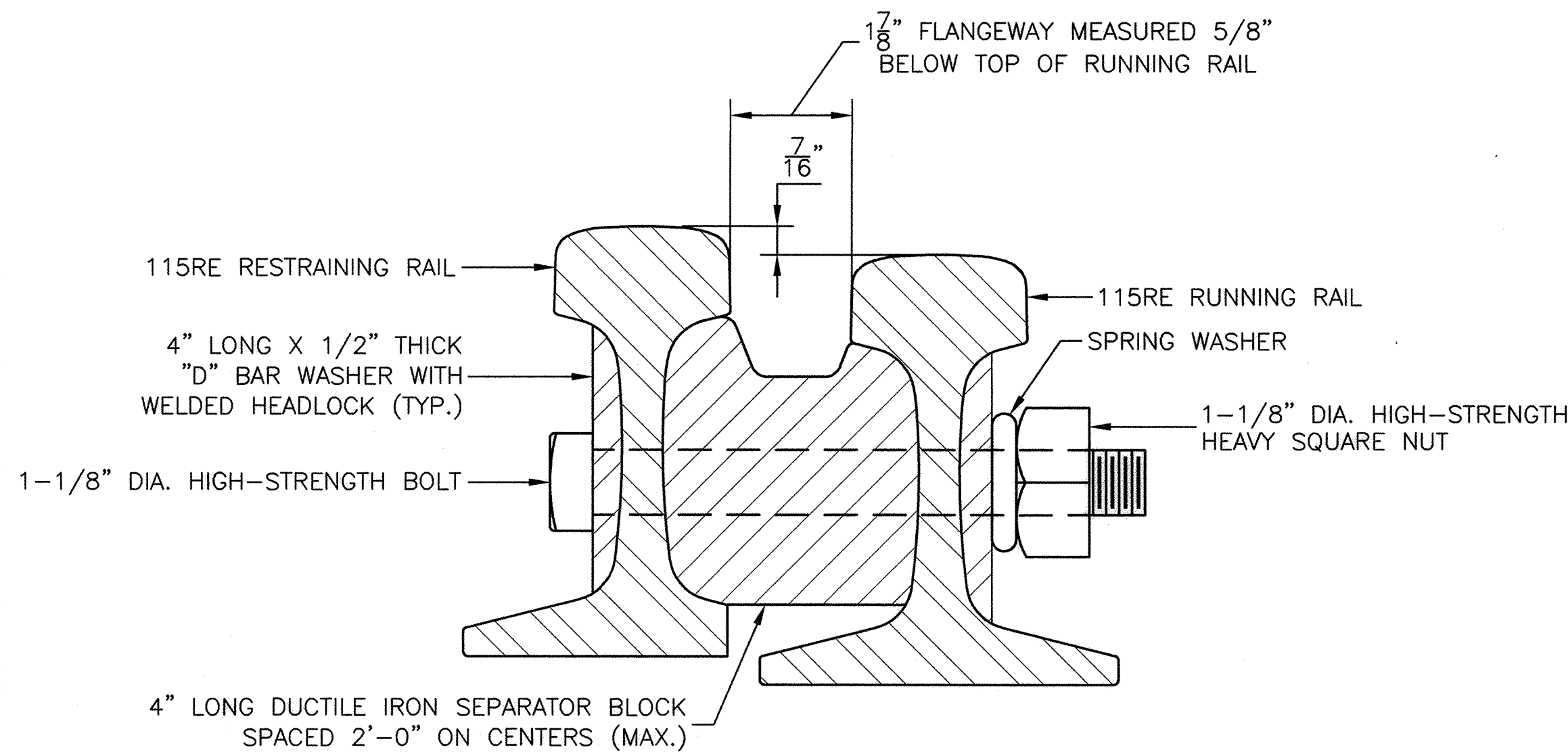








**TYPICAL SECTION AT RESTRAINING RAIL**  
FOR ADDITIONAL DETAILS, SEE TYPICAL SECTION AT UPPER RIGHT  
SCALE: 1/2"=0'-1"



**TYPICAL SECTION AT RESTRAINING RAIL  
(ELASTOMERIC GROUT AND EXISTING  
SLAB OMITTED FOR CLARITY)**

SCALE: 1/2"=0'-1"

**NOTES**

- SIDE PLANING AT END OF RESTRAINING RAIL SHALL MATCH FLANGEWAY IN ADJACENT PAVEMENT.
- NOT USED
- RESTRAINING RAIL ENDING IN OPEN BALLASTED TRACK SHALL HAVE PLANED FLARES SIMILAR TO AREMA PLAN NO. 504-89.
- FOR RESTRAINING RAIL LOCATIONS, SEE DWG. T-21.
- TRACK GAUGE AT RESTRAINING RAIL AREAS SHALL BE 4'-8-3/4".
- SAW CUT AND REMOVE SLICE OF EXISTING CONCRETE TRACK SLAB INSIDE OF RAIL TROUGH AS REQUIRED TO FIT RESTRAINING RAIL, BOOT AND FASTENING PLATES. DO NOT CUT REINFORCING STEEL EXCEPT WITH APPROVAL OF ENGINEER.
- AT RESTRAINING RAIL JOINTS, PROVIDE 10-INCH LONG SEPARATOR BLOCKS WITH 10-INCH LONG, 1/2" THICK D-BAR WASHERS AND TWO 1-1/8" DIAMETER HIGH-STRENGTH BOLTS PER SEPARATOR BLOCK. CENTER BLOCKS ON THE RAIL JOINTS.
- WELD THE JOINTS IN THE RUNNING RAILS. LOCATE SEPARATOR BLOCKS WITH THE NEARER EDGE OF THE BLOCK AT LEAST 6 INCHES FROM THE CENTER OF THE WELD.

**BILL OF MATERIAL - ELASTOMERIC BOOT/PLATE FOR TWO RAILS**

ITEM NO.	QUANTITY PER ASSEMBLY	DESCRIPTION - MATERIAL SUPPLIED BY CONTRACTOR
1	2 EACH	FULLY-THREADED ANCHOR ROD WITH FLATTENED END, 7/8" DIA X 10"
2	AS REQ'D	ANCHOR ADHESIVE (SEE NOTE 5, DWG. T-16)
3	AS REQ'D	ELASTOMERIC RAIL BOOT FOR TWO RAILS - CONTINUOUS
4	1	STEEL PLATE, 1/2"x4"x 16"
5	AS REQ'D	HEIGHT ADJUSTMENT SHIM(S) - VARIABLE THICKNESS
6	2 EACH	HEAVY-HEX NUT AND LOCK WASHER, 7/8" DIA
7	2 EACH	COMPRESSION CLIP
8	AS REQ'D	JOINING CUFF FOR ELASTOMERIC RAIL BOOT FOR TWO RAILS, 12" LENGTH (SIMILAR TO DWG T-17, SECTION A)
9	AS REQ'D	SEALER/ADHESIVE FOR ADHERING/JOINING CUFF TO ELASTOMERIC RAIL BOOT (SEE DWG T-17, SECTION A)
10	AS REQ'D	CONCRETE
11	AS REQ'D	ELASTOMERIC GROUT - TO SEAL ENDS OF RECONSTRUCTED TRACK (SEE NOTE DWG T-17, SECTION B)
12	2 EACH	RAIL CLIP INSULATOR
13	1	STEEL PLATE, 7/16"x4"x 7"

MARYLAND DEPARTMENT OF TRANSPORTATION



DMJM ET

DANIEL, MANN, JOHNSON, & MENDENHALL / EARTH TECH  
A JOINT VENTURE

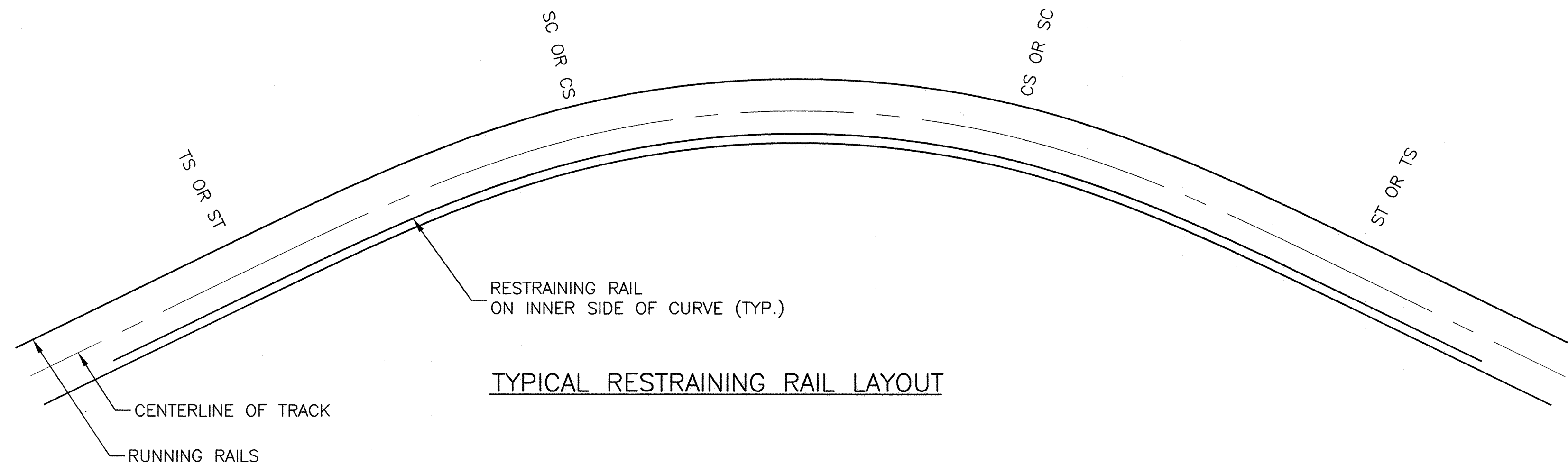


NO.	DESCRIPTION	BY	DATE
REVISIONS			

SDJ
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TMK

CENTRAL LIGHT RAIL LINE HOWARD STREET TRACK RECONSTRUCTION PHASE II
DETAILS - RESTRAINING RAIL AND RAIL BOOT
DATE: 7/27/01
SCALE: AS NOTED

CONTRACT NO. T-0857-0140
DRAWING NO. T-20
SHEET NO. 9 OF 9

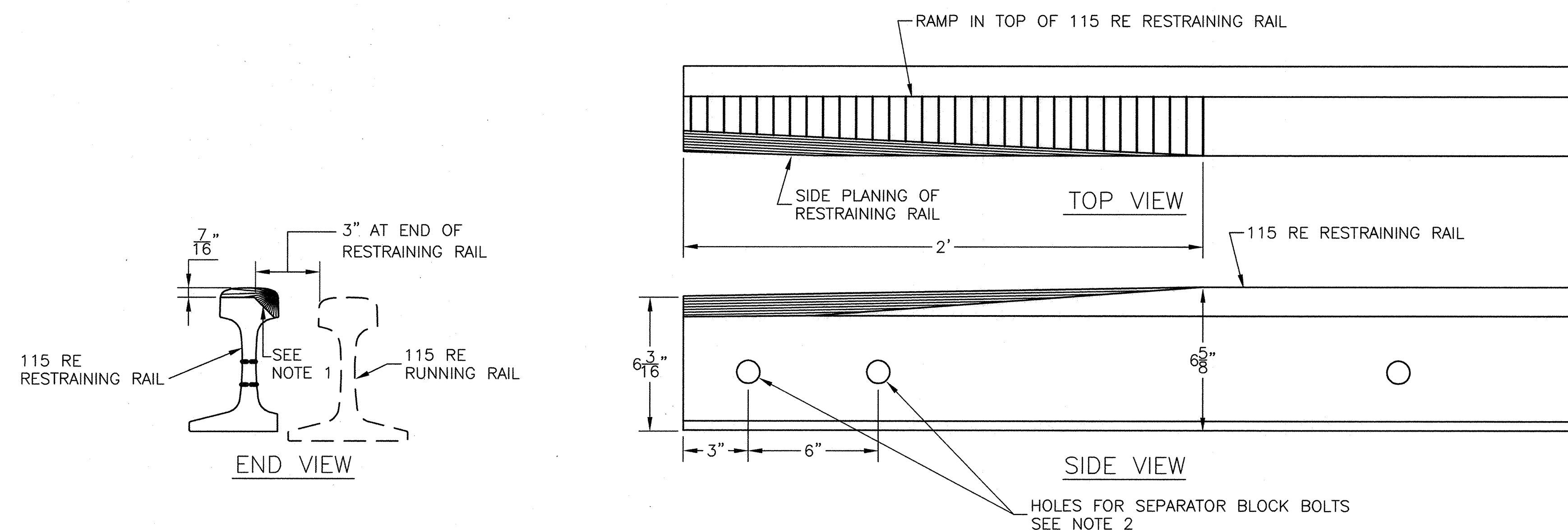


TYPICAL RESTRAINING RAIL LAYOUT

RESTRAINING RAIL LOCATIONS					
CURVE NO.	CURVE RADIUS (FEET)	BEGINNING OF RESTRAINING RAIL STA.	END OF RESTRAINING RAIL STA.	SIDE OF CURVE	EQUATIONS WITHIN LIMITS OF RESTRAINING RAIL
S/W 2 (NOTE 2)	VARIES (SPIRAL)	S/W 6+33	S/W 6+68	INNER	NONE
S/E 2 (NOTE 2)	VARIES (SPIRAL)	S/E 6+33	S/E 6+68	INNER	NONE
S/E 1	387.50 & SPIRALS	S/E 0+18	S/E 1+35	INNER	NONE
N/E 1	400.00 & SPIRALS	S/E 0+00 N/E 0+00	S/E 0+28 N/E 1+19	INNER INNER	N/E 0+00 BACK = S/E 0+00 AHEAD N/W 0+00 BACK = S/W 0+00 AHEAD

NOTES:

- PORTIONS OF SOME CURVES SHALL HAVE DOUBLE RESTRAINING RAIL DUE TO EXTENSION OF RESTRAINING RAIL FROM ADJACENT CURVE.
- LIMITS OF RESTRAINING RAIL IN LOMBARD STREET ARE PRELIMINARY. FURTHER DETAILS WILL BE PROVIDED TO CONTRACTOR BY THE ENGINEER.



DETAIL OF RESTRAINING RAIL ENDS AT PAVED AREAS

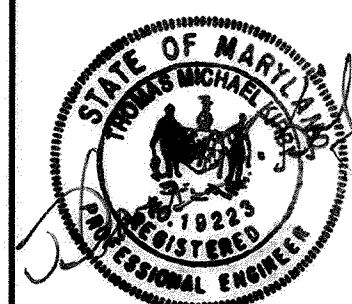
SCALE: 3"=1'-0"

MARYLAND DEPARTMENT OF TRANSPORTATION



DMJM ET

DANIEL, MANN, JOHNSON, & MENDENHALL EARTH TECH  
A JOINT VENTURE



NO.	DESCRIPTION	BY	DATE
REVISIONS			

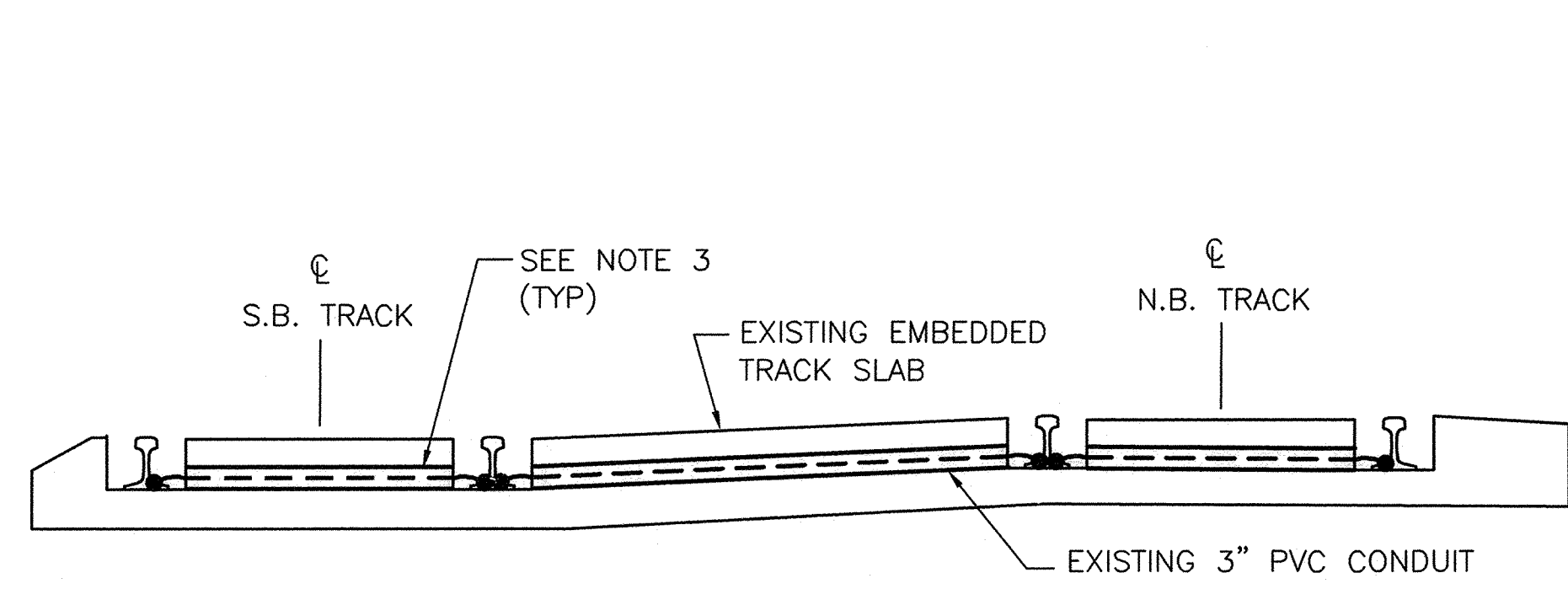
SDJ	DESIGN
TRS	DRAWN
DAS	CHECK
TMK	APPROVED

CENTRAL LIGHT RAIL LINE HOWARD STREET TRACK RECONSTRUCTION PHASE II	
RESTRAINING RAIL LAYOUT AND DETAIL	
DATE: 7/27/01	SCALE: NONE

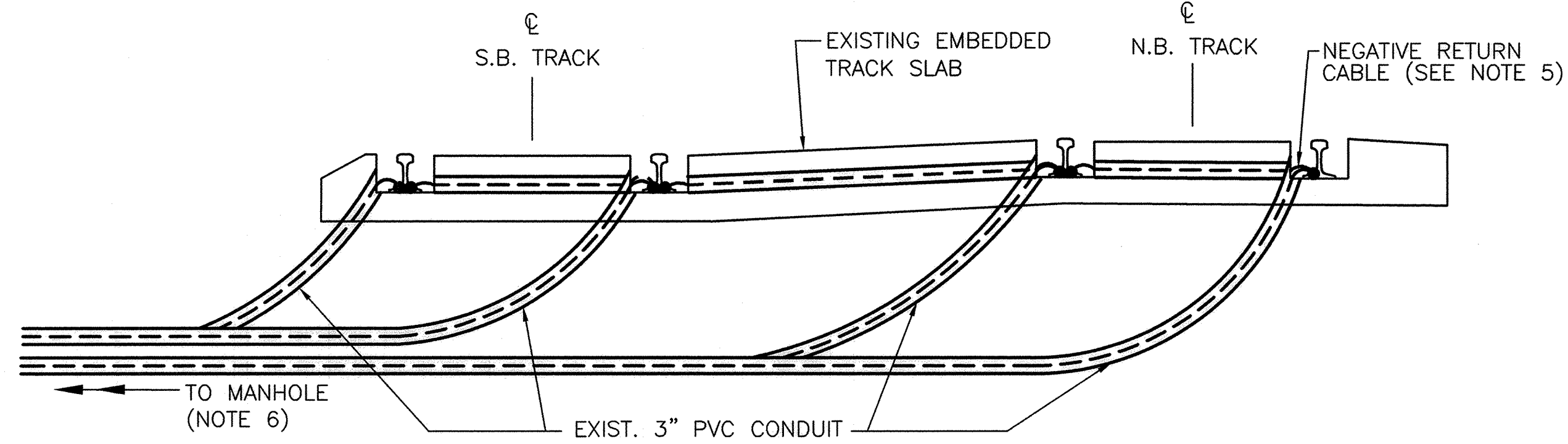
CONTRACT NO. T-0857-0140
DRAWING NO. T-21
SHEET NO. 10 OF 10



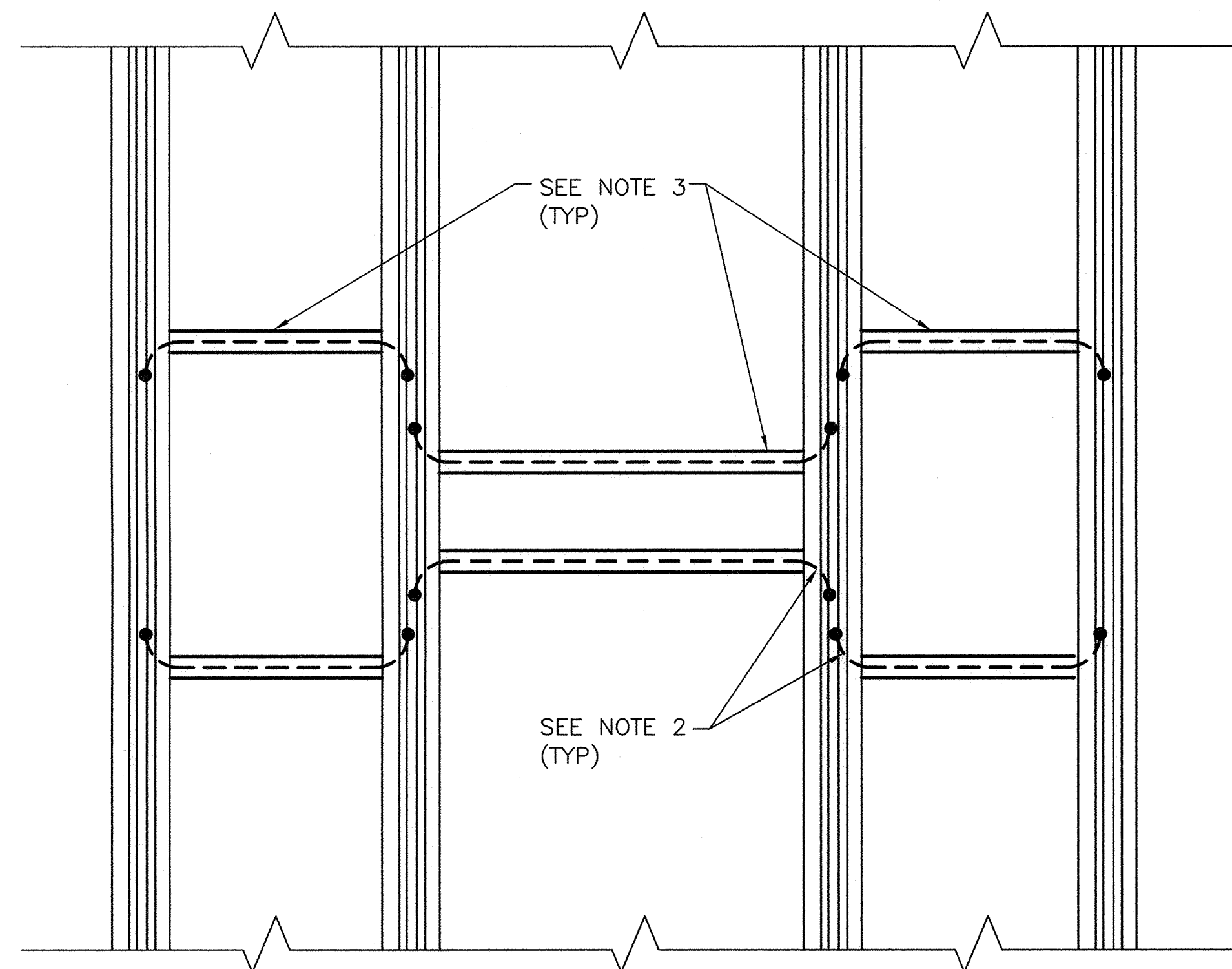




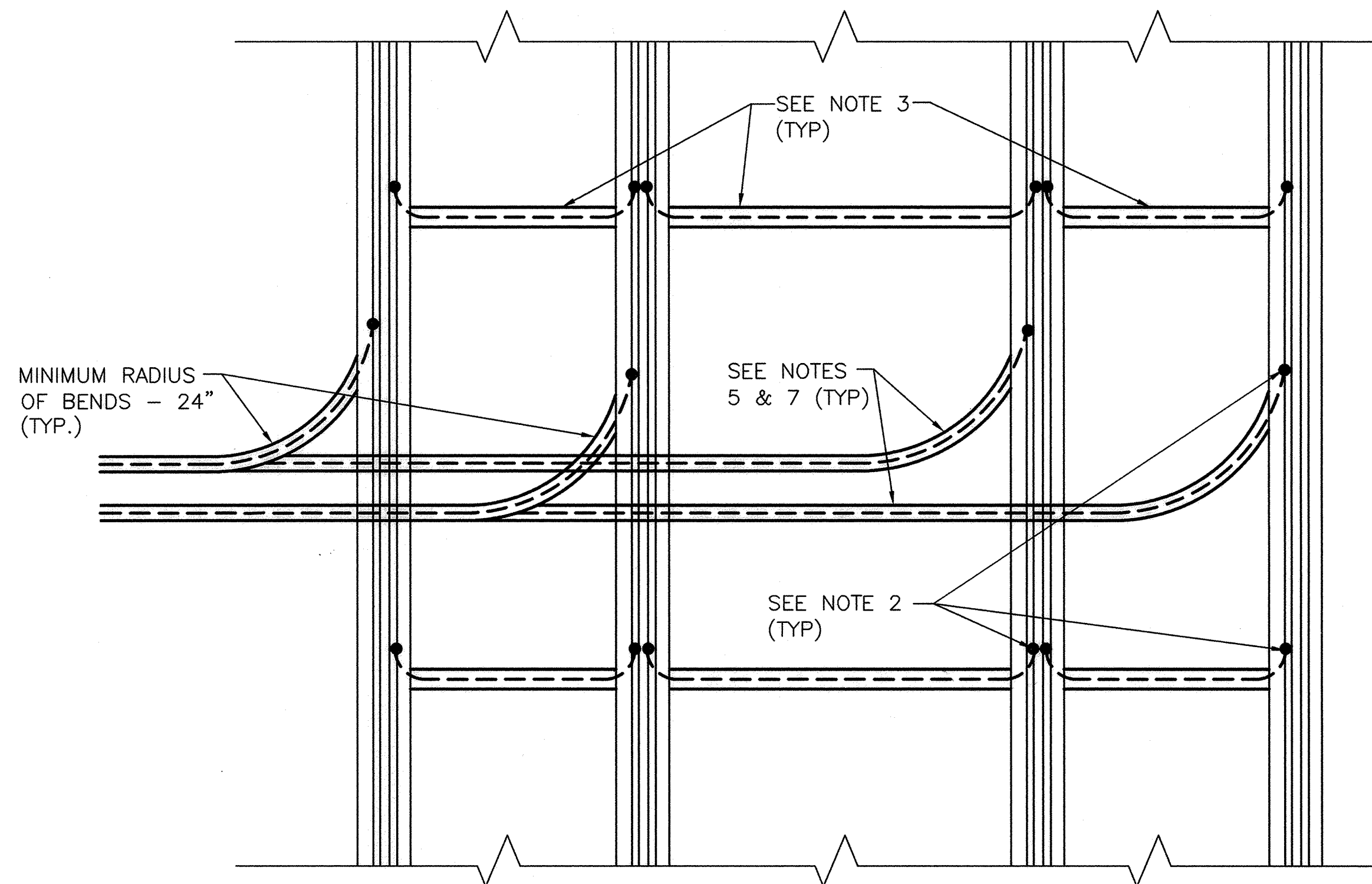
**SECTION**  
N.T.S.



**SECTION**  
N.T.S.



**PLAN**  
**EMBEDDED TRACK CROSS-BONDING (NOTE 1)**  
N.T.S.



**PLAN**  
**EMBEDDED TRACK- NEGATIVE RETURN CABLES**  
**REQUIRED AT STA N/W & N/E 29+60**  
N.T.S.

**NOTES:**

1. ALL CROSSBONDING CABLES SHALL BE 500 MCM, INSULATED CABLES INSTALLED AT THE FOLLOWING LOCATIONS:  
**EMBEDDED TRACK**  
STA. N/E 1+00  
STA. N/E & N/W 10+00  
STA. N/E & N/W 20+00  
STA. N/E 40+00  
STA. N/W 29+66
2. ALL CABLES SHALL BE EXOTHERMICALLY CONNECTED TO THE RAIL ENDS AND INSULATED AS SPECIFIED.
3. INSTALL ONE-500 MCM INSULATED CROSSBOND CABLE IN EACH 3-INCH PVC CONDUIT.
4. SEAL PVC CONDUIT WITH DUCT SEAL (OR EQUIVALENT) AFTER CABLES HAVE BEEN INSTALLED.
5. INSTALL TWO 500 MCM INSULATED NEGATIVE RETURN CABLES IN EACH 3-INCH PVC CONDUIT.
6. NEGATIVE RETURN CONDUITS SHALL REMAIN CONNECTED INTO MANHOLE INSTALLED IN SIDEWALK.
7. ALL CONCRETE ENCASED CONDUITS SHALL HAVE A MINIMUM OF 3-INCHES OF COVER.

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EARTH TECH  
A JOINT VENTURE

DMJM ET



NO.	DESCRIPTION	BY	DATE
REVISIONS			

SDJ	DESIGN
CEG	CHECK
DAS	DRAWN
TMK	DATE

CENTRAL LIGHT RAIL LINE HOWARD STREET TRACK RECONSTRUCTION PHASE II	
REPLACEMENT OF CROSS-BONDING & NEG RET CAB	
DATE: 7/27/01	SCALE: AS SHOWN

CONTRACT NO. T-0857-0140
DRAWING NO. T-26
SHEET NO. 12 OF 12